

sulphuretted hydrogen. The white felting which gives the name "white" is formed by threads of different species of *Beggiatoa*, a thread-like fungus classed with the Schizomycetes by Zopf and others who have stated that bacteria forms constitute a stage of their life-cycle. Thus *Monas Okenii*, *Bacterium sulphuratum*, *Clathrocystis rosea-persicina*, and *Beggiatoa rosea-persicina* have all been described as stages of a single life-history. Dr. Engler is extremely cautious on this point, and limits himself to what he has seen. He does not agree with Warming that *Monas Mülleri*, which occurs with the *Beggiatoæ*, is the young stage of one of them; although he has observed one species sending off motile spherical spores. Two new genera of thread-shaped fungi are described which were found on a *Gammarus locusta* living on the white bottom. The paper is illustrated by a number of admirably executed drawings.

Thus the volume forms a very considerable contribution to the accurate scientific knowledge of the Baltic, for the attainment of which the Commission was instituted. Like all the other work published by the Commission, it exemplifies in the most convincing manner the truth that, to obtain light on marine problems, what is required is not a mass of evidence from people all equally without knowledge on the subject, but continued and elaborate research.

MASCART AND JOUBERT'S "ELECTRICITY AND MAGNETISM"

Electricity and Magnetism. By E. Mascart and J. Joubert. Translated by E. Atkinson. Vol. I. (London: Thos. de la Rue and Co., 1883.)

WE took occasion some time ago to draw the attention of the readers of NATURE to the "Leçons sur l'Électricité et le Magnétisme," by Professors Mascart and Joubert; we have now to thank Prof. Atkinson for an English translation of this valuable work. This is not the place to inquire into the necessity for an English translation of any French scientific work, not to speak of one which makes such demands on the culture of its readers as this does. It is enough for us to know that the publishers and translator consider the number of semi-educated Englishmen sufficiently great to justify their venture; it is our part to speak to the merits of the work and the manner of the translation.

The alterations in the matter of the book are so slight as to call for no remark. Our first duty therefore reduces itself to a simple iteration of our high opinion of its value as a scientific manual. At the present time the public is well supplied with scientific instructors. The good intentions of all of them need not be doubted; but the inactivity or modesty of some and the incompetency of others have brought it about that there are large gaps in our repertory of science text-books either not filled at all or filled very unworthily. It would not be accurate to say that vol. i. of the treatise of MM. Mascart and Joubert fills the greatest of these gaps in the department of electricity and magnetism; nevertheless it fills a place not at present wholly occupied by any English text-book of merit. It has the misfortune, no doubt, of overlapping to a large extent the great work of Maxwell; but we believe that the tyro in the mathematical theories of electricity

and magnetism will find it of the greatest advantage to use Mascart and Joubert as companion and commentary to Maxwell's volumes. In all that relates to fundamental points and general theory Maxwell should be studied, even where he is hardest to follow, because his work was written, not to evade, but to meet, difficulties. On the other hand, Mascart and Joubert will be found invaluable in matters of detail. We know of no text-book in any language that contains such an abundance of elementary illustrations of electrical and magnetic theory, all arranged with an elegance peculiarly French.

The English version now before us is neatly printed and solidly got up. The translation on the whole is very well done. It would be easy to pick out small inaccuracies here and there, particularly in the early chapter. For some of these the translator is not altogether to blame; for the introductory part of the work seems to us to be less clear and carefully written than the following chapters, where the authors enter more into detail; and in that part of the book the translation leaves little to be desired. We noticed very few misprints, but one calls for correction: the name of van Troostwyk's collaborateur in the decomposition of water by the voltaic current was Deimann and not Diemann. No doubt this mistake occurs in the original; but the individual in question, though perhaps not widely known, yet deserved better than to be made quite unrecognisable. This brings to mind the only complaint of any gravity we have to bring against the editor of the English translation. Why did he not do something to remedy the one serious defect of MM. Mascart and Joubert's text-book, viz. the want of sufficient references to original sources of information? It must be remembered that the scientific student who goes the length of MM. Mascart and Joubert's leading strings is expected one day to walk alone; and some indication should be given him of the paths that lead to farther knowledge. A defect of the kind might be overlooked in a school primer, written to enable the oppressed school-master to screw a Government grant on the minimum qualification from some reluctant inspector, but is to be deplored in a work of the present pretensions.

Instead however of complaining farther of what MM. Mascart, Joubert, and Atkinson have not done (perhaps had not the leisure to do) for us, it will be more fitting to conclude by thanking them heartily for what they have done, and done so well. G. C.

OUR BOOK SHELF

Energy in Nature. By William Lant Carpenter, B.A. B.Sc. (London, Paris, and New York: Cassell and Co.)

THIS book is, with some additions, the substance of a course of six lectures on the Forces of Nature, and their mutual relations, delivered under the auspices of the Gilchrist Educational Trust.

It is of the greatest importance that the general body of the people, and more especially the intelligent artisan class, should become acquainted with the leading principles of the science of energy. The series of lectures delivered with this object represents one of the best sustained efforts to bring this great subject before the minds of this class of the people, and in collecting together and publishing these lectures the author has done a work which must be regarded as a scientific boon to the artisan.

In one respect this task has presented difficulties of a peculiar nature, due to the fact that our country has taken a leading part in developing the principles of energy—this science has in fact grown here, and the terminology has grown with it. At the present moment there is no man of science who speaks of the forces when he means the energies of nature, but there is a lagging behind in this respect amongst the body of the people, to whom the word force is a familiar one, and the word energy, in a scientific sense, very much the reverse. Accordingly one of the first duties of the author has been to define the exact relations between force and energy in a way suitable to his audience—a task which he has successfully achieved.

While in respect of importance the science of energy holds a paramount place, it is also a subject which lends itself admirably to the mode of treatment adopted by the author of this volume. Probably no subject is more difficult of conception on general principles merely, and without reference to the actualities of life. The philosopher in his study may have but a vague conception of these general laws, and his assent to the definition of work may be purely intellectual. Perhaps he may never have witnessed a well marked case of the transmutation of energy, nor may he have the consciousness that he himself is frequently the subject of such transmutations. The artisan is, however, in a totally different position. After a day's hard toil he is well able to realise in a very vivid manner the meaning of the word *work*. To spend his personal physical energy, and to recruit it by food, are operations in which he is constantly and consciously engaged. Hence it follows that a theory which borrows all these facts as illustrations of its truth appeals to the artisan in a much more emphatic way than it does to the mere student of science. To use the scientific terminology, the latter may have more *kinetic* intellectuality than the former, but the artisan is in a *position of advantage* which enables him to grasp the truths of the science. A book, therefore, which, like the present, abounds in good illustrations and in clear and simple statements, carrying practical applications, is one peculiarly fitted to a class better qualified by education and experience to perceive the concrete than to appreciate abstract general principles.

B. S.

Journal of the Royal Agricultural Society. Second Series, Part II. Vol. XIX. October, 1883. Price 6s. (London: John Murray.)

THE current number of the *Journal of the Royal Agricultural Society* has just reached us. It fully maintains the reputation so justly earned by previous numbers, and contains papers on many topics of present interest to agriculturists. Among the principal of these may be mentioned "The Progress of Fruit-Farming," by Mr. Whitehead, of Barming House, Kent, himself largely interested in this business. The continued reports upon Prize Farms are worthy of attention as showing what is being done on the best farms in various districts. A report on sheep-feeding experiments conducted at Woburn by Dr. Voelcker in his capacity of chemist to the Society, and a report on wheat mildew, by Mr. W. C. Little, of Stag's Holl, form the chief attractions to practical farmers. Among the more purely scientific or speculative contents may be mentioned a contribution from Rothamsted, by Sir John Lawes and his able coadjutor, Dr. Gilbert, upon the composition of drainage water collected at Rothamsted, and a valuable paper upon nitrogen as nitric acid in the soils and subsoils of certain fields on the same estate. The remainder of the volume is chiefly occupied with useful official matter, such as the Weather Report; the Botanical Report, by Mr. Carruthers; and Reports on Live Stock, Implements, &c., exhibited at York. A touching tribute is paid to the memory of a late president of the Society, the late Lord Vernon, by Mr. Wells, him-

self an ex-president. Perhaps the most striking and instructive paper is that by Mr. Thomas Bell upon the Yorkshire Prize Competition, containing a full report of the Tuiers Wood and East Park Farms, occupied by Mr. Turnbull. In these days, when dairying is justly attracting very special attention, it is highly interesting to receive sound information as to the methods used on thoroughly well-managed farms. A daily record of the milk yielded by each cow in a dairy containing 100 animals in milk is in itself highly useful, and worthy of imitation. It is impossible in a short notice like the present to open up the various topics dealt with. It has ever been the wise policy of the "Royal Agriculturist" to fill its pages with contributions from specialists upon their own specialities. There is no padding or superfluous discursiveness, and sometimes to the uninitiated there may appear to be a want of that introductory and explanatory matter which entices on the general reader. As a record of agricultural research and progress, the journal holds a high position, which the number just issued fully maintains.

J. W.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

On Chepstow Railway Bridge, with General Remarks suggested by that Structure

IN a letter to NATURE of some months past, suggested by a special subject of engineering, I pointed out the necessity of clearly understanding the effects of endwise pressure on metallic columns, in respect of its tendency to cause springing or buckling of the columns. I remarked that there is a total want of experiments on the subject (Mr. Hodgkinson's observations, made on a very small scale, being excepted), and I gave some details of a theory by which the effective arrangement of such experiments might perhaps be facilitated. I have lately observed in an engineering work a failure of a different class arising from endwise pressure, of a kind which I had not anticipated, and which appears to be perhaps more dangerous than even the buckling to which I had called attention.

In the neighbourhood of Chepstow, the River Wye is crossed by a railway bridge of a single span. The four corners of the bridge are supported by iron tubular vertical, columns of considerable length. One of these columns (on the Monmouthshire side of the river, and on the lower side of the bridge as regards the course of the river) is split, with several important longitudinal fissures. To avert the present destruction of the bridge, strong iron hoops have been placed surrounding this tube, drawn tight by screws and nuts, exhibiting a somewhat unsightly appearance.

For clear understanding of this state, the reader may figure to himself a cask or barrel, set on its end, and loaded on the top till its staves burst outwards; then he must conceive a hoop to be placed round the body of the cask, and drawn till the edges of the staves are wholly or nearly in contact.

I do not doubt that this column is now safe. But there are other columns supporting the bridge which are exposed to the same dangers: the bridge is heavy, the loads from the Taff and the Tawe are not light, and the jar of ponderous locomotives may try every original weak point or may create new ones; and I think it would be well provisionally to encircle the other supporting columns in the same way as the one which has failed.